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ABSTRACT

This report describes a validation effort made to determine the effectiveness of a package of eight instructional modules which deal with equal opportunity and sex discrimination in physical education. A sample of preservice and inservice physical education teachers used the modules. The modules were validated through administration of pre and posttests of attitude and knowledge measures. Validation was attempted under conditions of self-instruction. Data indicated that participation resulted in attitude changes that reflected less sex role differentiation and greater educational equity. Increased knowledge of sex role stereotyping and equity was also demonstrated by program participants. Validity and reliability statistics are reported. (MK)

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TEACHER EDUCATION MODULES: REDUCTION OF SEX BIAS IN COEDUCATIONAL INSTRUCTION AND PROGRAM OPERATION FOR PHYSICAL EDUCATION SECONDARY LEVEL

January, 1978 - August, 1979

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ABSTRACT

The project, known as Physical Educators for Educational Equity, was funded under two grants from the Women's Educational Equity Act. Its purpose was to develop and validate a package of eight instructional modules which would (1) encourage attitudes which reflect equality of opportunity in physical education, (2) increase knowledge of sex role stereotyping in physical education, (3) increase knowledge of practices, strategies, and skills which support sex fair program planning and instruction in physical education.

A Kentucky sample (N=196) and a national sample (N=45) of preservice and inservice physical education teachers participated in the course of modular instruction during the fall of 1978 and the spring of 1979. Under conditions of self-instruction participants studied the eight modules, one or two a week, within a period of four to eight weeks. The maximum time required to complete a module was one hour.

In order to validate the modules, pretests and posttests were administered using two instruments: the Sex Role Differentiation in Physical Education Attitude Inventory (SRD/PE Attitude Inventory) and the Sex Role Stereotyping/ Educational Equity in Physical Education Knowledge Test, Forms A and B (SRS/ EEPE Knowledge Test). The Attitude Inventory was constructed to evaluate attitudes toward differential treatment of boys and girls in physical education. Scores on the inventory reflected an attitude continuum ranging from liberal (little difference in treatment on the basis of sex) to conservative (great difference in treatment on the basis of sex). The Knowledge Test was designed to measure the degree to which participants comprehended the material included in the modules.

The validity of the instruments was examined. The attitude inventory produced scores that were related to certain personal data variables and which were consistent with findings reported in other research studies on sex role stereotyping in education. The knowledge test was found to differentiate ($p < .000$) among groups who scored high (upper 25%), average (middle 50%), and low (lower 25%).

When alpha coefficients were calculated, the reliability of the attitude inventory was .88. The reliability coefficient of each knowledge test form was .78.

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Attitude and knowledge scores changed significantly beyond the .05 level for the entire group (N=241). When attitude and knowledge change scores were analyzed by geographical location (Kentucky sample--N=196 and national sample--N=45), job status (preservice--N=136 and inservice teachers--N=105), semester of participation (fall--N=118 and spring--N=123), significant differences were not found within the groups. That is, the national sample did not change more than the Kentucky sample, preservice teachers did not change more than inservice teachers, and the spring sample did not change more than the fall sample. However, each of the six groups did change significantly in both attitude and knowledge scores.

Knowledge and attitude change scores were examined by selected personal data variables. The modules were not found to be more effective with women (N=120) than with men (N=121), with any level of age (19-24 years, 25-30 years, 31-63 years), with any level of teaching experience (none, 1-6 years, 7-34 years), or with any level of education achieved (no degree, bachelor's, master's degree) when changes in scores were tested at the .05 level.

Attitude scores of women teachers were considerably more liberal than those of men. That is, women's attitude scores seemed to reflect less differentiation based on sex. Average attitude scores for all observed groups moved toward the more liberal end of the attitude continuum after the modules were completed. The groups for whom the greatest average attitude changes occurred were preservice teachers, the 19-24 years of age group, and women.

In conclusion, participation in the course of modular instruction resulted in attitude changes which reflect less sex role differentiation and greater educational equity. Modular instruction also resulted in an increase in knowledge related to sex role stereotyping and educational equity.

Although validated under conditions of self-instruction, the modules would be suitable for use in workshop and classroom setting. A Leader's Handbook containing additional activities and supplementary resources was developed to facilitate group instruction. Teacher preparation programs as well as inservice training programs and other modes of continuing education may find the materials useful.

PROGRAM AREA: Teacher Education, Reduction of Sex Role Stereotyping and Sex Discrimination in Secondary School Physical Education

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INTERVENTION TITLE, LOCATION: Teacher Education Modules for Reduction of Sex Bias in Coeducational Instruction and Program Operation for Physical Education.

Kentucky Sample: Various regions of Kentucky
National Sample: One site in each of seven states (OK, TX, MI, NJ, IA, FL, VA)

DEVELOPED BY: Physical Educators for Educational Equity, Eastern Kentucky University, Richmond, KY 40475

SOURCE AND LEVEL OF FUNDING:	1978	1979
Women's Educational Equity Act Grant.	73,425	48,735
Eastern Kentucky University inkind funds.	30,562	17,372

YEARS OF INTERVENTION DEVELOPMENT:
Original grant--January 1978 through December 1978
Continuation grant--January 1979 through August 1979

BRIEF DESCRIPTION OF INTERVENTION. Eight instructional modules were developed for the purpose of helping preservice and inservice secondary physical education teachers reduce sex bias (sex role stereotyping and sex discrimination) in program planning and instruction. Instructional modules were developed (1) to encourage attitudes which reflect less sex role differentiation and which promote educationally fair practices, (2) to increase knowledge of sex role stereotyping in physical education, (3) to increase knowledge of practices, strategies, and skills which support sex fair program planning and instruction.

Claims of effectiveness. It is claimed that participation in a course of modular instruction will result in:

1) a change in attitude from more conservative (traditional) to more liberal in terms of sex role differentiation. That is, attitudes will reflect less intense distinctions as to what is sex-appropriate.
2) an increase in knowledge about sex role stereotyping and educational equity in physical education.

Beneficiaries and users. The instructional modules were developed for physical educators teaching or preparing to teach at the secondary level, grades 7 to 12. No similar materials exist which directly address sex role stereotyping and educational equity in physical education. Hence, virtually all preservice and inservice physical education teachers could be potential users of the materials.

Context in which modules operate. Ideally users would be in classroom or group settings which would encourage discussion, use of supplementary materials, and investigation of selected topics. A Leader's Handbook has been prepared to facilitate study in group settings.

The modules were validated under less structured conditions. Claims of effectiveness are made only for conditions of self-directed study with supervision provided only during pretest and posttest periods. The tone of supervision provided was neutral with the site coordinators showing neither a positive or negative reaction toward the materials.

Characteristics of participants. Participants were preservice and inservice physical education teachers. Inservice teachers were teaching physical education at the secondary level (grades 7 to 12), had at least one degree with a major in physical education, and were certified to teach physical education. Preservice teachers were physical education majors preparing to student teach or actually in student teaching at the secondary level.

Participants ranged in age from 19 to 63 years. The average age was 27.7 years (SD=8.9). Teaching experience ranged from zero to 34 years. The average years of experience was 4.5 years (SD=6.7).

Preservice Kentucky teachers were selected from Eastern Kentucky University, Western Kentucky University, and the University of Kentucky. Each university has a large program for preparation of physical education teachers. Inservice teachers were drawn from small towns (Richmond, Mt. Sterling, and Hazard) and from urban areas (Lexington, Louisville, Frankfort, Florence, and Covington).

The national sample included teachers located at sites in seven states. Six to eight teachers were included from each site. Sites were Edmond, Oklahoma; Houston, Texas; Milford, Michigan; Piscataway, New Jersey; Sioux City, Iowa; Tallahassee, Florida; and Williamsburg, Virginia.

Intervention. Participants were oriented to the project by a site coordinator. A personal data form, an attitude inventory, and a knowledge test were completed by each participant. Working independently each subject completed eight instructional modules. Site coordinators administered the posttest attitude inventory and knowledge test after the participants completed the modules.

The instructional modules included the following topics: introduction to stereotyping and discrimination, historical perspectives, effects of sex role stereotyping, biological sex differences, Title IX, curriculum development, teacher behavior, and evaluation. Module content was selected following research of topics and consultation with physical educators similar to the target population. Preliminary drafts were reviewed by physical education teachers. Eight consultants were selected to review and critique module content and format. Modules were revised based on input from teachers and consultants.

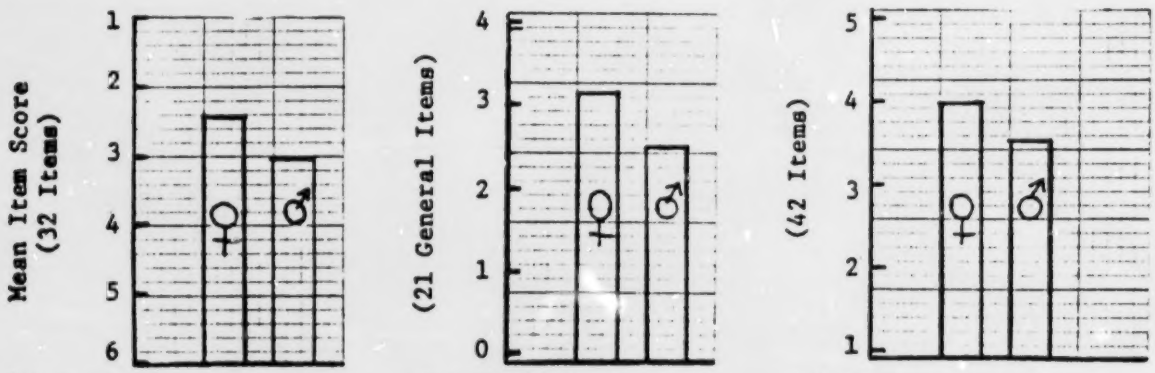
Cost of adoption. The estimate of cost per user based on rates established by the Educational Development Center Printing Office is $2.50 (one cent per page) for a set of eight modules. The estimated cost of a Leader's Handbook is $1.00.

EVIDENCE OF EFFECTIVENESS:

Interpretability of measures. Because intervention was short termed and focused on selected subject matter, instruments were required that were specific to the project goals. Two instruments were developed to meet these requirements, the Sex Role Differentiation in Physical Education Attitude Inventory (SRD/PE) and the Sex Role Stereotyping/Educational Equity in Physical Education Knowledge Test (SRS/EEPE).

1) SRD/PE Attitude Inventory. Behaving differently toward boys and girls and holding different expectations based on sex is referred to as sex role differentiation. This was the attitude object upon which the SRD/PE inventory was based. The inventory consists of forty-two items scored on a five point Likert-type scale. Summated responses ranged from 210, which represents a liberal attitude or little differentiation based on sex, to 42, which represents strong differentiation based on sex.

Evidence that the construct, "attitude toward sex role differentiation," exists was found in numerous research studies of sex role stereotyping. Data from the SRD/PE Attitude Inventory were compared with data from two studies which used Likert-type instruments and which purported to measure attitude toward sex roles. Comparative data are shown in Figure 1. Subjects represented were (a) white community college students (N=84),[1] (b) teachers and administrators from fourteen states (N=1219),[2] and (c) preservice and inservice physical educators who were administered the SRD/PE Attitude Inventory (N=241).



(a) Hawley's Attitude Toward Sex Roles Inventory.

(b) Silver's Attitude Toward Sex Role Differentiation in Education.

(c) SRD/PE Attitude Inventory.

Figure 1. Comparison of Data From Three Attitude Instruments.

[1]American Institutes for Research, "Criterion Validation Studies," News About WEEA Evaluation Sourcebook Development, No. 3 (December, 1978), p. 2.

[2]Paula R. Silver, Richard S. Podemski, and Ann W. Engin, "Attitudes Toward Sex Role Differentiation in Education: Implications for Title IX Implementation," Journal of Research and Development in Education, No. 2, 10 (Spring, 1977), pp. 26-35.

Data from all instruments exhibited similar strength of response and showed that women were more liberal than men in attitude toward sex roles. Consistent with Silver's report, SRD/PE data indicated that educators were only moderately liberal in expressed attitude toward sex role differentiation.

Using a oneway analysis of variance it was found that the SRD/PE Attitude Inventory discriminated among subjects when grouped according to scores falling in the highest 25%, middle 50%, and lowest 25%. Each group differed significantly from the other two groups (Table 1).

TABLE 1: DIFFERENCES AMONG ATTITUDE SCORES OF THE PARTICIPANTS IN THE HIGHEST 25%, MIDDLE 50%, AND LOWEST 25%

Attitude Groups	N	SRD/PE Score (≤ of items)	Standard Deviation	F-Ratio	F-Prob.**
Highest 25%	60*	179.8	9.6		
Middle 50%	117	158.5	5.2	516.4	<.000
lowest 25%	64*	139.0	7.2		

*Unequal Ns due to tie scores at P_{25}.

**Student-Newman-Keuls Range Test indicated that all groups differed significantly at the .05 level.

When alpha coefficient was calculated using the pretest data, internal consistency reliability was .88. Correlations between pretest and posttest data indicated that the inventory had stability. Although pretest and posttest data spanned a four to eight week interval, a correlation of .73 was attained (N=241). Consistent patterns of response among samples from different geographical locations, with different job status, and who participated during different semesters (Table 4, p. 6) provided further evidence of the stability of the measure.

2) SRS/EEPE Knowledge Test. The SRS/EEPE Knowledge Test Forms A and B were developed to evaluate knowledge of sex role stereotyping and educational equity in physical education. The contents were delimited to information included in the eight instructional modules. Each test form consists of forty multiple choice items.

Test analyses were conducted which included examination of (1) item difficulty, (2) item discrimination, and (3) internal consistency of test forms. Posttest data were used to evaluate the knowledge test.

The test forms were moderately difficult (Table 2). Subjects did not achieve the test ceiling at posttest; thus, test forms seemed to be of appropriate difficulty for the level of the participants.

All items on both test forms discriminated positively between subjects who scored high and those who scored low on the total test. Statistical characteristics of Forms A and B of the Knowledge Test are shown in Table 2. Although the forms were developed by randomly assigning items of similar content to each test, the forms cannot be considered parallel forms of the same test. Data indicated that Form B was slightly more difficult.

TABLE 2: CHARACTERISTICS OF FORMS A AND B OF THE SRS/EEPE KNOWLEDGE TESTS--40 ITEM TESTS

Characteristics	Form A (N=119)	Form B (N=122)
Mean ($\bar{X}$)	30.28	27.59
Median	31.45	27.80
Standard Deviation (SD)	4.95	5.52
Range	38-15	37-14
Standard Error (SE)	.45	.50
Alpha Coefficient	.78	.78

Oneway analyses of variance were conducted to determine if the test forms would differentiate among participants when grouped into the highest 25%, middle 50%, and lowest 25% according to total test score.[5] The analysis indicated that each group differed significantly beyond the .05 level from each of the other groups in knowledge score. The internal consistency determined by using coefficient alpha was .78 for each form.

Design of research. The effectiveness of the instructional modules was evaluated using a pretest-posttest design. A control group was not included, thus multiple group verification was necessary. Comparisons were made between groups separated by: 1) location—Kentucky sample and National sample; 2) job status—preservice and inservice teachers; 3) time—fall and spring samples.

The SRD/PE Attitude Inventory was administered as a pretest and posttest measure. Half the participants were given Form A of the SRS/EEPE Knowledge Test at pretest and Form B at posttest. The other half received Form B at pretest and Form A at posttest. The intent was to reduce the effect of recall and to counterbalance any effects that might be operating due to differences in forms.

Credibility of evidence. Site coordinators administered pretests and posttests and conducted the intervention as planned. Site coordinators for the Kentucky sample were four members of the project staff. A national site coordinator was selected for each state represented. Site coordinators were given very specific instructions to follow in order to assure consistency and eliminate biases. Site coordinators solicited subjects who met the required criteria for participation.

An analysis of data was directed by a member of the project staff. Data were examined for completeness and thereafter handled by computer systems. Computer checks were made to identify missing data, incorrectly entered data, and other forms of error created through the mechanical process of recoding, grading test forms, and collapsing data.

Evidence of impact--attitude change. Attitude scores changed significantly when data were tested at the .05 level using a t-test for paired data. The average change in attitude scores was 4.8 (Table 3).

TABLE 3: CHANGE IN SRD/PE ATTITUDE SCORES OF PRESERVICE AND INSERVICE PHYSICAL EDUCATION TEACHERS

Subjects	N	Pretest		Posttest		Change	t-Ratio	t-Prob.
		$\bar{X}$	SD	$\bar{X}$	SD			
Teachers	241	159.2	16.3	164.0	18.4	4.8	5.75	<.000

When geographical location was the focus of analysis, it was found that attitude scores changed significantly, beyond the .05 level for the Kentucky sample as well as for the National sample. When analyzed by job status, both preservice and inservice teachers' attitudes changed significantly. Subjects who participated during the fall as well as those participating in the spring had significantly changed attitude scores (Table 4).

TABLE 4: CHANGES IN SRD/PE ATTITUDE SCORES WHEN ANALYZED BY GEOGRAPHICAL LOCATION, JOB STATUS, AND SEMESTER OF PARTICIPATION

Groups	Samples	N	Pretest		Posttest		Change	t-Ratio	t-Prob.
			$\bar{X}$	SD	$\bar{X}$	SD			
Location	Kentucky	196	158.7	16.4	163.2	18.8	4.5	4.96	<.000
	National	45	161.8	15.7	167.7	16.7	5.9	2.92	.005
Job Status	Pre-service	136	159.2	16.6	165.1	19.2	5.9	5.64	<.000
	In-service	105	159.3	16.0	162.6	17.4	3.3	2.50	.014
Semester	Fall	118	159.2	15.8	163.8	18.6	4.6	3.62	<.000
	Spring	123	159.3	16.8	164.3	18.3	5.0	4.56	<.000

Attitude scores of women teachers were considerably more liberal than those of men teachers as shown in Table 5. When change scores of men and women were analyzed separately, it was found that both groups changed significantly at the .05 level. Further analysis using a oneway analysis of variance indicated that women changed significantly more than men with the exact probability of the F-ratio of 7.0 falling at the .009 level of significance.

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TABLE 5: CHANGES IN SRD/PE ATTITUDE SCORES OF MEN AND WOMEN PHYSICAL EDUCATION TEACHERS

Sex	N	Pretest		Posttest		Change	t-Ratio	t-Prob.
		$\bar{X}$	SD	$\bar{X}$	SD			
Men	120	150.8	13.7	153.4	14.5	2.6	2.23	.028
Women	121	167.7	14.2	174.6	15.6	6.9	6.00	<.000

A comparison of posttest data of men and women, Table 6 indicated that 75% of the women fell above a score of 163 and 75% of the men fell below a score of 162.

TABLE 6: QUARTILE ATTITUDE SCORES OF MEN AND WOMEN--PRETEST AND POSTTEST DATA

Quartile	Pretest		Posttest	
	Women	Men	Women	Men
Q_4	204	195	206	199
Q_3	175	159	182	162
Q_2	164	150	174	151
Q_1	157	140	163	145

When attitude change was evaluated by age, it was found that the youngest age group, 19-24 years, changed significantly more than the 25-30 age group (Table 7). They did not change significantly more than the 31-63 age group.

TABLE 7: CHANGE IN SRD/PE ATTITUDE SCORES WHEN ANALYZED BY AGE

Age Groups	N	Pretest		Posttest		Change	F-Ratio	F-Prob.
		$\bar{X}$	SD	$\bar{X}$	SD			
Age (Yrs.)								
19-24	124	159.5	17.4	165.9	19.4	6.4*		
25-30	48	158.1	13.4	159.2	16.5	1.1	3.07	.048
31-63	69	159.7	16.3	164.0	17.5	4.3		

*Student-Newman-Keuls Range Test indicated that 19-24 age group differed from the 25-30 age group at .05 level.

When changes in attitude were evaluated by job status, years of teaching experience, and highest degree earned, differences within each group were not significant (Table 8).

TABLE 8: DIFFERENCES WITHIN GROUPS WHEN CHANGE IN ATTITUDE WAS ANALYZED BY JOB STATUS, YEARS OF TEACHING EXPERIENCE, AND HIGHEST DEGREE EARNED

Groups	N	Pretest		Posttest		Change	t-Ratio	t-Prob.
		$\bar{X}$	SD	$\bar{X}$	SD			
Job Status								
Preservice	136	159.3	16.6	165.1	19.2	5.9	2.3	.129
Inservice	105	159.3	16.0	162.6	17.4	3.3		
Experience (Yrs.)								
None	124	159.2	16.9	164.7	19.3	5.5		
1-6	53	160.1	14.3	164.6	17.5	4.5	.58	.561
7-34	63	159.0	16.8	162.4	17.6	3.4		
Highest Degree								
None	108	158.5	16.1	164.6	18.8	6.1		
Bachelor's	76	159.9	17.2	163.5	18.6	3.6	1.02	.363
Master's	57	159.7	15.7	163.6	17.9	3.9		

Attitude scores of all observed groups moved toward the more liberal end of the attitude continuum. Indications were that preservice teachers, the youngest age group, and women experienced the greatest changes in attitude.

Evidence of impact—knowledge change. An analysis of knowledge test scores indicated an increase from pretest to posttest by an average of 3.6 points, a significant change when tested at the .05 level (Table 9).

TABLE 9: CHANGE IN SRS/EEPE KNOWLEDGE SCORES OF PRESERVICE AND INSERVICE PHYSICAL EDUCATION TEACHERS

Subjects	N	Pretest		Posttest		Change	t-Ratio	t-Prob.
		$\bar{X}$	SD	$\bar{X}$	SD			
Teachers	241	25.3	4.9	28.9	5.4	3.6	9.68	<.000

When groups were analyzed by geographical location, job status, and semester of participation, it was found that all groups changed significantly at the .05 level (Table 10).

TABLE 10: CHANGE IN SRS/EEPE KNOWLEDGE SCORES WHEN ANALYZED BY GEOGRAPHICAL LOCATION, JOB STATUS, AND SEMESTER OF PARTICIPATION

Group	Subjects	N	Pretest		Posttest		Change	t-Ratio	t-Prob.
			$\bar{X}$	SD	$\bar{X}$	SD			
Location	Kentucky	196	25.1	4.8	28.5	5.5	3.4	8.06	<.000
	National	45	26.2	5.2	30.7	4.6	4.5	5.83	<.000
Job Status	Preservice	136	25.1	5.1	28.5	5.6	3.4	6.91	<.000
	Inservice	105	25.6	4.6	29.5	5.2	3.9	6.78	<.000
Semester of Participation	Fall	118	25.3	4.8	29.0	5.2	3.7	7.35	<.000
	Spring	123	25.3	5.0	28.8	5.6	3.5	6.39	<.000

Teachers were grouped by sex, age, years of teaching experience, or highest degree earned, and their knowledge change scores evaluated to determine if significant differences existed within each category. No differences were found within any of the groups. Thus, the modules did not appear to be more effective with women than with men, with any level of age, with any level of teaching experience or with any level of education achievement.

Statistical reliability, internal validity, and generalizability. Data in Tables 3 through 10 show consistencies for pretest, posttest, and change scores. No pretreatment differences (.05 level) were found in attitude or knowledge scores between the Kentucky and national samples, preservice and inservice samples, fall and spring samples when tested using the t-test for independent groups. Each of these groups changed significantly in attitude and knowledge.

Consistencies were also observed when participants were grouped by personal data variables. The variable of sex was the only grouping that broke the consistency pattern, a finding which was in keeping with other research.

In order to gain support for internal validity, subjects were solicited who differed in geographical location, job status and semester of participation. Analysis of data indicated that changes in attitude and knowledge were consistent across these various groups. Because of the size and diversity of the sample as well as the maturity of the participants it is believed that systematic changes did not occur due to such factors as regional characteristics, educational background, experience, effect of holidays, seasonal school pressures, or similar programs or experiences.

Other factors affecting internal validity could have been the pretest and testing conditions. The attitude inventory was constructed to reduce recall and systematic marking of responses. The positive-negative orientation of attitude statements as well as the agree-disagree scale of statements varied. The knowledge test forms for pretest and posttest contained different questions (different forms); thus, the effect of recall was not

present. Test sessions were supervised by site coordinators who were trained and paid to conduct the tests according to set standards.

It is believed that the claims of effectiveness are generalizable, to the target population for which the instructional modules were developed. Teachers who participated in modular instruction were varied in background, experience, and personal characteristics. Although not selected by a truly random method, a broad range of characteristics was sampled and findings indicated that changes in knowledge and attitude were consistent across all groups.

Educational significance. Traditional preparation and experiences of physical education teachers have reinforced attitudes and values which perpetuate sex role stereotyping and educational inequities based on sex. The necessity of compliance with Title IX Guidelines has created new circumstances in the public school physical education: more coeducational classes, new activity assignments, adjustments in program operation, and changes in policies which previously affected boys and girls differently. Many educators recognize the need for inclusion of curriculum material in teacher preparation and inservice training programs that encourage sex fair programs and instruction.

College curriculums have lagged behind the rapid changes in public schools. Instructional material addressing sex bias and educational equity have been slow to develop. Curriculum implementation has been difficult because sexism in physical education is an emotional and controversial subject for many physical educators. Beliefs and attitudes that have been firmly entrenched and strongly reinforced are difficult to challenge and slow to change. Changes in beliefs, attitudes, and practices are expected to require a long term effort over several generations of physical education teachers.

This course of modular instruction is an initial effort to address sex fair physical education in the secondary schools, an area where few curriculum materials exist. The cost of the modules per participant is low and the materials are adaptable for use in virtually any teacher preparation or inservice education program.